



**MIDWEST
CHP
APPLICATION
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In Partnership with
the US DOE

combined heat & power in ethanol plants

Adkins Energy LLC 5 MW CHP Application

Fact Sheet

Quick Facts

Location:

Lena, Illinois

Ethanol Capacity:

42.5 million gallons per year

Energy Plant Equipment:

One Solar Turbine with Victory
Heat Recovery Steam Generator

Generating Capacity:

5.0 MW

Thermal Capacity:

25,700 lbs/hr 125 psi pressure
steam

Equipment Cost:

Approximately \$3 Million

Annual Energy Savings:

\$903,000

Simple Payback:

Approximately 3.3 years

System Online:

August 2002

Project Overview

The Adkins Energy LLC was formed by farmer led cooperatives in northeastern Illinois to develop an ethanol plant with a capacity of approximately 43 million gallons per year. The plant, which has been in operation since August, 2002 was designed by Lurgi/PSI Corporation, and is located in Lena, Illinois.

Approximately 99% of the electrical energy requirements of the ethanol plant are supplied by a 5 MW combustion turbine based combined heat & power (CHP) system. The CHP system incorporates a heat recovery steam generator (HRSG) that recycles the waste heat from the turbine into approximately 25,700 lbs / hr steam that satisfies approximately 32% of the thermal requirements of the ethanol production process.

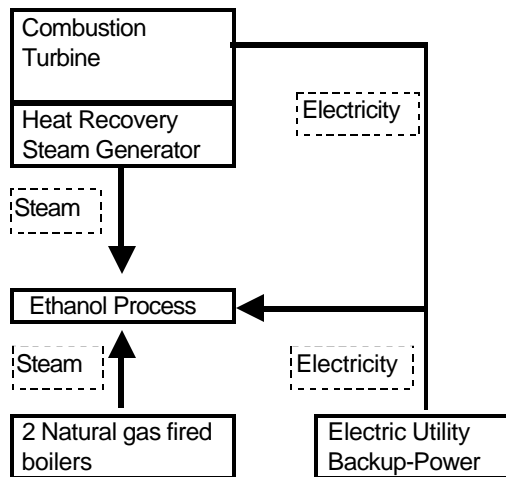
The backup system for the electrical power required by the ethanol plant, should the gas turbine be down for maintenance, is the local electric utility grid. The ethanol plant is also equipped with two natural gas fired packaged boilers that provide the additional steam not provided by the CHP system. Should the CHP system be down for maintenance, the two boilers are capable of providing sufficient steam for the entire ethanol production process.

The combination of the CHP system with heat recovery, integrated with the local electric utility grid and the two packaged steam boilers provides the Adkins Energy Ethanol Plant with a highly reliable and extremely cost effective energy system.

Adkins Energy LLC Ethanol Plant



Major Energy Plant Components



Electric Reliability and Cost Savings with CHP

During the conception of the ethanol plant project, Adkins Energy LLC learned that feed mills in the surrounding area pay as much as \$0.17 per kWh (electricity and demand charge combined). Faced with these high electric rates, Adkins Energy evaluated the installation of an on-site electric generating system, and concluded that a CHP system would provide the perfect fit for its energy needs.

Based on its current natural gas cost of \$5.50 per million Btus, Adkins Energy is able to save approximately \$903,000 per year. Adkins Energy estimates its break-even point for total energy savings from the CHP system to be at natural gas prices of \$8.10 per million Btus.

In addition to high electricity prices in northeastern Illinois, the area also experiences multiple grid outages per year. Although the CHP system normally supplies over 95% of the plant's electrical power needs, it is parallel connected to the grid to allow the plant to draw electrical power from the grid when needed. When blackouts or grid outages occur, the CHP system is designed to automatically disconnect from the grid and continue to supply the plant with its electrical needs. This avoids any plant shut down during utility grid outages.

Project Benefits

- Lower overall combined electric and natural gas utility costs.
- Payback on the CHP investment of approximately \$3 million estimated to be 3.3 years
- Highly reliable electric and thermal energy system based on:
 - CHP with utility grid as backup power
 - Two packaged boilers capable of providing full steam requirements of the plant
- CHP system capable of automatically switching from grid parallel to grid independent during utility outages

Solar Turbine with Heat Recovery Unit



For further information contact

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“The CHP system has been a very reliable and cost effective energy solution for our ethanol plant.

I would install the same energy system again”

*Mert Green
Adkins Energy LLC*

“The CHP system provides stability for our electricity supply regardless of electricity grid failure”

*Ray Baker
Adkins Energy LLC*

